Lepidoptera (Rhopalocera)

By C. A. GIBSON-HILL

Several previous collections of butterflies have been made on Christmas Island. The first was in January 1887, by the officers of H.M.S. "Flying Fish" under Captain Maclear. They found *Eurema hecabe amplexa* (*Terias amplexa*) and *Trepsichrois climena macleari* (*Vadebra macleari*). J. J. Lister in September of the same year took additional specimens of these and added *Hypolimnas bolina listeri* (*H. nerina*, var. *listeri*) and *Nacaduba aluta*. C. W. Andrews, working from August, 1897 to May, 1898, confirmed the presence of the four previously recorded, and obtained representatives of five further species, *Danaida chrysippus* f. *petilia* (*Limnas petilia*), *Precis villida villida* (*Junonia villida*), *Hypolimnas misippus*, *Eriboea pyrrhus andrewsi* (*Charaxes andrewsi*) and *Melanitis determinata* (*M. ismene*, var. *determinata*). These are the nine species included by A. G. Butler in the "Monograph of Christmas Island" (1900). One of them, *determinata*, represented in Andrews' collection by a single specimen, is definitely not a resident on the island, while a second, *misippus*, is of doubtful status. Of the remaining three species all true residents, *petilia* is very seasonal, and *andrewsi* difficult to catch, but it is a little surprising that *villida*, which is common and well distributed, was not taken by the earlier collectors.

Mr. M. W. F. Tweedie, made a collection in August and September 1932. It was described by H. M. Pendlebury (Bull. Raffles Mus. 8, 1933), who identified eleven species, the seven undoubted residents previously listed, and four forms hitherto not recorded from the island. These latter include two more residents, *Hypolimnas antilope anomala* (previously unrecorded but actually first taken by Dr. Hanitsch in 1904) and *Trepsichrois eleutho*, and two additional species, *Appias paulina micromalayana* and *Zizeeria gaika*, both wanderers.

The collection on which the present account is based, was made from the beginning of 1939 to the middle of 1940. It includes representatives of all the previously recorded species, except *Melanitis determinata*, and a further addition, *Catopsilia crocale crocale*. It was formed not so much with the idea of adding more migrants to the list as of determining, as far as possible, the true fauna of the island. For this reason, in the subsequent description, the species are listed under three heads;

undoubted residents, of which there are nine; possible residents of which there is one, *Hypolimnas misippus misippus;* and undoubted wanderers of which four have, at various times, been recorded. In addition an attempt has been made to assess the distribution of the resident species in both time and place. From these observations it would appear that the majority of the butterflies occur during the dry patches of the wet months, and must be considered as potentially rainy season forms. This applies even to *Hypolimnas bolina listeri*, although it is possible in the wide variation of this species to recognise patterns corresponding to the wetter and drier periods during which it is found. Only *Danaida chrysippus* and *Precis villida* can be definitely referred to the driest months, while if the dry season becomes over-well established, as in 1940, the remaining species may disappear entirely, except for an occasional *Trepsichrois macleari*. The best period for collecting the endemic butterflies is, therefore, the first month or two after the end of the rains, when most of them are very plentiful. The most suitable locality is the north coast road, which gives easy access to all the necessary types of habitat. The migrants ought to be encountered most frequently during the first four to five months of the year. Apart from all other factors this is the only period when the north-east winds blow with any regularity, but it is interesting to note the high proportion of migrants taken at other times. They would thus appear to be carried more by the abnormal than the normal winds.

True Residents.

Family PIERIDAE

Eurema hecabe amplexa (Btlr.).

This species, which is normally very plentiful, is well spread through the thinner jungle over the whole island, although it is slightly commoner on the shore terrace than on the plateau. It does not venture out over the larger open spaces, but it is always abundant along the sheltered portions of the north coast road. It occurs at intervals all through the year, appearing in considerable numbers during the first hot, sunny days following a fairly prolonged spell of wet weather. During the succeeding weeks it becomes slowly scarcer, until, after one, two or three months, suitable conditions liberate another batch. If the dry season is long and complete, imagos become very rare, and may temporarily disappear entirely.

The females, which are much less common than the males, are rather variable and occasionally approach the male pattern.

Family DANAIDAE

Danaida chrysippus L. forma petilia Stoll.

This is essentially a dry weather species. If, as in 1940, the rainy season is broken by long fine spells a certain number of specimens may be found early, but in an average year imagos are absent until the dry season has fully established itself. Then in the course of a few days in late August or September they suddenly appear abundantly over all the open, slightly windswept, portions of the island. They are especially plentiful along the coast and in the neighbourhood of North-east Point. One or two later batches may appear at intervals of three to four weeks, but by November the species is usually scarce again.

Trepsichrois climena macleari (Btlr.).

This is a common species occuring, like *Eurema hecabe amplexa*, through the thinner jungle and more shaded open spaces all over the island. It is seasonal, appearing mostly in the spells of clear weather following rainy periods, but it never disappears entirely.

The males are much commoner than the females.

Trepsichrois eleutho subsp.

This species was first taken on Christmas Island by Mr. M. W. F. Tweedie who caught a single male at the end of August, 1932. Several other specimens were seen, but it was not at that time possible to decide definitely whether or not they were migrants. In my experience the species usually frequents small, slightly clearer patches in the jungle. It has a strong flight, seldom settling, so that capture is difficult. However, there can now be little doubt that it is, though scarce, a true resident. Numbers were seen from July to September in 1939 and from June to August in 1940, and two males, expanse 75·5 mm. and 69 mm., were taken in July and August of the former year. These males agree very closely in wing pattern with Mr. Tweedie's specimen.

Family NYMPHALIDAE

Precis villida villida (Fabr.).

This butterfly can be found all the year round but it is most numerous in the early dry weather, from May to September, when it becomes very plentiful. It frequents principally the scattered open stretches along the coast, and on the north coast road occurs, in contrast to *Eurema hecabe*, only in the unsheltered portions. In spite of the constant wind with which they often have to battle individual specimens seem to adhere closely to

certain restricted areas. One, easily distinguishable by a conspicuous jagged tear on the border of one forewing, was observed, over a period of more than three weeks, somewhere along a thirty yard section of the path, spending the whole day working up wind close to the ground and then rising a little to be blown back again to its starting place.

The larvae, which do considerable damage to Verbena and similar garden plants, are common in July and August. They are off-black and dark-grey in colour, with a ring of grizzled spines round each segment. The period spent in the pupa is variable, ranging from fifteen to twenty days. The imagos usually emerge about noon or early in the afternoon.

As in *Danaida chrysippus* the frequency of the sexes is about equal.

Hypolimnas antilope anomala (Wall.).

This species was not collected by Andrews, and the specimens taken by Tweedie in 1932 are the basis of the first record for the island, although the Malayan museums contain unrecorded specimens' caught by Dr. Hanitsch in September (near Panchoran Bay), and October (Flying Fish Cove 1904.

Like *Eurema hecabe* and *Trepsichrois climena macleari*, it occurs plentifully, during the spells of clear weather following long wet periods, throughout the thinner jungle and more shaded open spaces all over the island. In May and June, just after the end of the rainy season, it may become abundant and at this period the females seem to predominate, although usually the males are slightly commoner.

The males are very variable. The common form agrees with typical *anomala*, but a few specimens are diverging in the direction of *stellata* or *interstincta*.

The larvae are gregarious, feeding together in batches of twenty-four to thirty. At first they are black with a ring of black, prickly spines round each segment, and a pair of spines protruding forward, like horns, over the head. Later the spines become a bright yellow with the colour tending to spread round the segment between them to form a complete ring. They pupate about the twenty-fifth day. The pupae are a mid oak-brown with the spines, which are finer and sharper than in *H. bolina*, and the lines of the wing nervures picked out in black. The imagos emerge, after eleven, or more rarely ten, days, in the early morning and are nearly always ready to fly by nine a.m.

Hypolimnas bolina listeri (Btlr.).

This butterfly has a distribution in both time and place somewhat similar to that of the preceding species except that if, as frequently happens, the first burst of rainy weather is followed

by a dry, sunny spell, it may become very common at the beginning as well as the end of the wet season. It addition it is a stronger flier, and spreads further over the few open spaces.

The male, in addition to certain inconstant irregularities in size (the expanse ranges from 58 mm. to 79 mm.), exhibits two distinct colour patterns for the under surface of the hindwing. The principal difference is in the pale transverse band. In the more typical forms occurring in the drier weather this is merely suggested in pale cream, while in most of the specimens taken during the wetter months it is a broad, well-defined, almost white, streak. In the forms with a cream-washed band the basal colour of at least the outer portion of the wing is a much richer, more reddish, brown. Certain of the wet season specimens are indistinquishable from some males of *H. bolina incommoda* Btler, taken in Selangor, Malay States, in 1939.

The female, as the history of the species shows, is very variable both in size (the expanse ranges from 62 mm. to 93 mm.) and pattern, and only an extensive collection, taken over a long period, can be regarded as representative. As in the male it is possible to recognise wet and dry season forms, although individuals bridging the gap between the two extremes make possible a nicely graded series. The majority of females taken in the drier weather resemble the males of that period on the under surface, except that the light bar is frequently obsolete and there is a rich orange-brown area on the posterior portion of the forewing, spreading just beyond vein two. On the upper surface there is, typically, an orange-brown patch on the same wing, over the distal portion of that on the under surface, varying slightly in size, and a largish blotch of the same colour over the centre of the hind-wing. This latter is not constant, and may be a pale iridescent blue, or even completely absent so that the specimen comes to resemble *aphrodite*. In a number of variations, mostly occurring in the damper weather, this blotch is whitish; in some it is pure white, with a suggestion of pale blue along the proximal border: such specimens are indistinquishable from female *incommoda* taken in Selangor. In other examples the patch is white with an orange-brown, or pale brown, edge, or it may be entirely a rich cream colour. Some of these paler blotches cover more than half the wing, and in most of these specimens the orange-brown area on the forewings is paler and larger, extending almost to vein three. In the majority of such specimens the white band on the under surface of the hind wing is relatively stronger and broader, resembling, or even exceeding, that of the wet season male. Such examples constitute the typical wet season female form.

The eggs, like those of *H. anomala*, are laid on the under surface, near the base, of the leaves of *Claoxylon rubescens*,

though the groups are smaller in number and rarely contain more than five or six. The larvae are completely black for the first two instars, and during this period remain together. Later the spines turn to a bright, slightly orange, yellow and the larvae then tend to scatter. They pupate about the twenty-seventh day. The pupae are a mid-reddish-brown with the spines, which are blunter and shorter than in *H. anomala*, faintly tinged with gold. The imagos emerge, after nine, or more rarely eight, days, in the early morning and are nearly always ready to fly by nine a.m.

Eriboea pyrrhus andrewsi (Btlr.).

This species is confined almost entirely to the warmest months of the year, November-December and February-April, when it is met chiefly on clear, sunny days following damp periods. It is by no means rare, but it is a strong, high flier, difficult to catch and seldom seen. It can be attracted down by slashing a stink-wood tree, *Celtis cinnamomea*, when it will come to take the sap, but it remains very cautious and ready to fly up. The larva has not been collected, but it is probable that its normal foodplant, as with other *Eriboea*, is one or more of the members of the *Caesalpinia* group. Adults are often seen round the upper branches of *Delonix regia*, even when the blossom is finished, and a single pupa was found on an unidentified tree of this family in November 1940.

Family LYCAENIDAE

Naccaduba aluta subsp.

This butterfly is fairly common among low plants on the edges of clearings, chiefly on the north coast shore terrace, during the greater part of the rainy season. In the dry weather it usually disappears completely. Under normal circumstances the females are more plentiful than the males.

Possible Residents.

Family NYMPHALIDAE

Hypolimnas misippus misippus Linn.

The two previous records of this species from Christmas Island, are confusing. Andrews caught a single female, "much rubbed and shattered", in Flying Fish Cove in March, 1898. Butler, the recorder, noted that "it was the only specimen seen, and appeared immediately after north-easterly gales, so that there can be little doubt that it was blown over from Java". On the other hand, Ridley, ("An expedition to Christmas Island", Journ. Straits Br. Asiat. Soc., 45, pp. 121–271) described *misippus* as "very abundant" during the latter half of October, 1906, adding that it "evidently bred in the island as the specimens

were in excellent condition". Unfortunately it has not been possible to locate these specimens in the collections of the Malayan museums, and it seems possible that Ridley confused *bolina* and *misippus*. At the same time it is probable that this species does breed on the island, or that if not already established, it is at least in the process of becoming so. Several specimens were seen between April and June, 1939: six were caught over a small patch of waste ground near Rocky Point in May and June. These were two males and four females, the latter, mimics of *Danaida chrysippus* L., including both pale and dark forms. Five, all except one of the males, were in very good condition.

Migrants.

Family PIERIDAE

Appias paulina micromayalana (Fruh.).

This species, definitely not a true resident, appears occasionally along the north coast following prolonged spells of north-easterly wind. It was first taken on the island by Tweedie in August-September 1932. He collected three males and eight females, including four forms of the latter—f. *punctata* Fruh., f. *flava* Rober., f. *citronella* Fruh. and f. *albina* Bsdv. (Pendlebury, Bulletin Raffles Museum, 8, 1933, p. 95). Several specimens were seen at the end of December 1939, and during the following month: I was only able to catch one. It was probably an example of the form *ambigua*, but was too damaged for certain identification.

Catopsilia crocale crocale Cram.

Four or five examples of this species appeared over open ground near Rocky Point at the end of May, 1940. One was caught two days later. It was a male of the form *alcmene*, (the upper surface with a yellow basal, but white distal, half to both wings), in perfect condition.

Family NYMPHALIDAE

Melanitis ismene var. determinata Btlr.

A single female of the wet-season phase was taken by Andrews. It has not been recorded since.

Family LYCAENIDAE

Zizeeria gaika Trim.

Tweedie took three examples of this species in August-September 1932. I found a single specimen in July 1939 and another in August 1940. I am not satisfied that the species is resident on the island.